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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,514	05/24/2007	Marzio Giglio	09728.0389USWO	8312
23552	7590	08/14/2009		
MERCHANT & GOULD PC P.O. BOX 2903 MINNEAPOLIS, MN 55402-0903			EXAMINER RICHEY, SCOTT M	
			ART UNIT 2877	PAPER NUMBER
			MAIL DATE 08/14/2009	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/589,514

**Applicant(s)**

GIGLIO ET AL.

**Examiner**

Scott M. Richey

**Art Unit**

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 July 2007.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-25 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 15 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date 8/15/2006, 7/2/2007  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Specification***

The disclosure is objected to because of the following informalities: The specification refers to claim 1, in the 2<sup>nd</sup> paragraph of page 1, without explicitly setting for the subject matter to which it refers. The specification should be "full, clear, concise and exact" in the description of the applicants' invention. It is suggested that the subject matter referred to in claim 1 be included here in the specification or that this paragraph be deleted from the specification. See 37 CFR 1.71(a).

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 17-25 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The statute sets forth the four classes of invention in the alternative. Therefore, a single claim may not encompass more than one statutory class of invention. Dependent claims 17-25 are clearly set forth as apparatus claims, but they depend, either directly or indirectly, from process claim 1. This rejection might easily be overcome by setting forth claim 17 as independent from claim 1.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-3, 7, 10, 12, and 14-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicants regard as the invention.

Claim 2 describes identification of "the interference fringe systems" as a determination of the fractional order at the centre relative to the individual fringe systems. Firstly, both the "interference fringe systems" and the "individual fringe systems" lack sufficient antecedent basis in the claim. Secondly, the claim is ambiguous because "fringe systems" are not defined in the disclosure and so one of ordinary skill in the art has no way of determining which or how many fringes comprise a fringe system. Further, the relationship of the defined "fractional order" to the unknown systems is indeterminate. For the purpose of applying art in the interest of compact prosecution, the claim is interpreted to require detection of a zero-order fringe and at least one higher-order fringe.

Claim 3 recites "the interference fringe systems," which lacks sufficient antecedent basis and is indefinite similarly to claim 2.

Claim 3 includes the term "depth." The specification discloses "depth of intensity modulation" and "depth of modulation," neither of which shed light on what the applicants intended by the term *depth* in the claim. The term *depth* has many definitions; the apparent closest definition is "degree of intensity." Degree of intensity of modulation or degree of intensity of intensity modulation, however, are insufficiently clear language and render the claim indefinite.

Claim 7 describes the position of the observation region as "outside the Rayleigh zone close to the position of smallest diameter of the beam." That which is "close to the position of the position of the smallest diameter" cannot be determined from the claim as set forth.

Claim 12 states that "the determination of the properties of the particles presupposes the determination of the position of transit of the particle through the incident beam by analysis . . . ." Whether the presupposition or the determination results from the analysis cannot be determined. Whether the determination of the position is part of the claimed step is unclear. By extension, whether the analysis is a required step is unclear. For the purpose of applying art in the interest of compact prosecution, the claim is construed to require at least a determination of at least a particle.

Claims 1-3, 10, and 14-17 contain the term *system* as either *fringe systems* or *systems of fringes*. The term *system* is not defined in the disclosure. The common definition of "a set" renders the claim indefinite because no boundaries are defined. One of ordinary skill in the art of optical interferometry would not have notice as to which fringes or how many fringes constitute a system as intended by the applicants. Further, the person of ordinary skill would not know the parameters of the system which the applicants intend to be used. In other words, neither the claims nor the disclosure describe if the summed intensity of the fringes comprising the system is to be utilized, if the number of fringes in the system is to be utilized, or if some other parameter of the system is to be utilized in the process and apparatus. For the purpose of applying art in

the interest of compact prosecution, instances of the term *system* are construed to require the presence of at least one higher-order fringe.

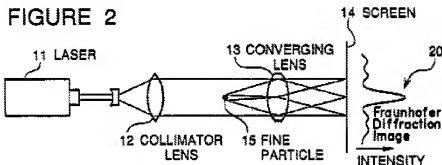
**Claim Rejections - 35 USC § 102**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7, 9, 10, 14, 15, 17, 18, 20, 21, 23, and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,534,999 ("Koshizuka").



Koshizuka discloses a method of measuring properties of particles, as substantially shown in Figure 2, comprising the steps of:

(Claim 1) generating a beam of radiation which is propagated along a principal direction (11), illuminating with the beam an observation region which is occupied or transited by a plurality of particles (region around 15; system described "to detect fine particles of sub-micron as contaminant in fluid"), a portion of the beam giving rise to radiation which is scattered by scattering interaction of that portion of the beam with the particles, and another portion being transmitted substantially undisturbed along the

principal axis through the observation region (see entire figure), and detecting (14), in a plane disposed on the propagation direction, a plurality of radiation intensity values which are determined by the interference between the scattered radiation and the transmitted radiation ("Fraunhofer diffraction"), identifying systems of interference fringes associated respectively with the individual particles in which the interference pattern is affected by a phase delay of the scattered radiation relative to the transmitted radiation (inherent in the detection of Fraunhofer fringes), the delay being determined by the interaction of the radiation beam with the particles (inherent within the Fraunhofer diffraction), and determining the properties of the particles on the basis of the fringes that are affected by the phase delay (the disclosed system detects "existence" of particles and the "number" of particles);

(Claim 2) wherein the process detects a zero-order fringe and at least one higher-order fringe ("Fraunhofer diffraction" detected at 14; for further reasoning, see rejection under § 112 above);

(Claim 3) the identification of the interference fringe systems comprises a determination of the depth of intensity modulation relative to the individual fringe systems (20 clearly shows the central peak and higher-order fringes, and hence, is considered to anticipate the claim language as set forth.);

(Claim 4) wherein the radiation beam has a plane wave front (equivalent to the collimated beam);

(Claim 5) in which the detection plane is disposed at a predetermined distance  $z_M$  from the observation region such that the relationship  $z_M > a^2/\lambda$  is valid, where  $\lambda$  is a

characteristic value for the wavelength of the radiation used and  $a$  is dimension which is characteristic of the particles contained in the observation region (inherent that a dimension " $a$ " of the particle anticipates the claim language);

(Claim 6) the radiation beam is focused in the vicinity of the observation region (Figure 2 utilizes a "converging lens" to focus the fringes. Such focusing is "in the vicinity of" the region.);

(Claim 7) the position of the observation region is selected so as to be outside the Rayleigh zone close to the position of smallest diameter of the beam (The observation region is outside the Rayleigh zone. The limitation "close to the position . . ." is construed as merely describing the Rayleigh zone, which is the area outside but very near a focused beam.);

(Claim 9) the illumination and the detection are performed from opposite sides of the observation region (11 and 14 are on opposite sides of 15);

(Claim 10) arranged so as to determine the fractional order at the centre of the system of interference fringes produced by a single particle at a time (entire figure);

(Claim 14) the determination of the interference fringe systems associated respectively with the particles comprises a determination of the centres of a plurality of interference fringe systems produced by a corresponding plurality of particles (The Fraunhofer diffraction image clearly shows a center of the fringes and clearly shows multiple centers of multiple fringe systems.); and

(Claim 15) the determination of the interference fringe systems associated respectively with the particles comprises a determination of a power spectrum of the

electric field corresponding to the plurality of radiation intensity values (The power spectrum of the E-field is implicitly determined as it is a function of intensity, which is clearly shown.)

Koshizuka discloses an apparatus arranged for implementing a measurement method according to claim 1, substantially shown in Figure 2, comprising:

(Claim 17) a source of the radiation beam, suitable for illuminating the observation region (11), sensor means suitable for detecting the radiation at a plurality of points simultaneously and for making available a signal indicative of the detection (14), the sensors being disposed on the propagation axis in a manner such as to detect a plurality of radiation intensity values which are determined by the interference between the scattered radiation and the transmitted radiation, in which the interference is affected by a phase delay of the scattered radiation relative to the transmitted radiation, the delay being determined by the interaction of the radiation beam with the particles (entire figure), and processing means which are programmed to determine, on the basis of the signal, interference fringe systems associated respectively with the individual particles, and to determine the properties of the particles on the basis of the fringes which are affected by the phase delay (image detection is described as "formed by a computer");

(Claim 18) lens means interposed between the observation region and the sensor means so as to permit indirect detection by detection of the plurality of intensity values in an optically conjugate plane (13; The examiner notes that the claim appears to

attempt to invoke 35 U.S.C 112, sixth paragraph. The additional recited structure precludes such invocation.);

(Claim 20) further comprising a system for shaping the wave front, suitable for focusing the radiation in the vicinity of the observation region (12; While the collimating system is not disclosed in this embodiment as focusing in the vicinity of the observation region, the lens system is *suitable* for focusing.);

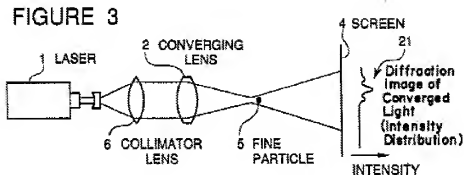
(Claim 21) further comprising a system for shaping the wave front, suitable for collimating the radiation that is incident on the observation region (12 or 13, both are suitable for collimating radiation incident on the observation region);

(Claim 23) the sensor means comprise a plurality of photodiodes arranged in manner such as to detect, as a function of time, the intensity distribution produced by the interference between transmitted radiation and scattered radiation ("photo-diode alley"); and

(Claim 24) the photodiodes are arranged in a manner such as to pick up selectively radiation coming from predetermined zones of transit of the particles (positioned at 14).

Claims 1, 11-13, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Koshizuka.

Koshizuka discloses a method of measuring properties of particles, as substantially shown in Figure 3, comprising the steps of:



(Claim 1) generating a beam of radiation which is propagated along a principal direction (1), illuminating with the beam an observation region which is occupied or transited by a plurality of particles (region around 5), a portion of the beam giving rise to radiation which is scattered by scattering interaction of that portion of the beam with the particles, and another portion being transmitted substantially undisturbed along the principal axis through the observation region (see entire figure), and detecting (4; also, Figure 1, element 4), in a plane disposed on the propagation direction, a plurality of radiation intensity values which are determined by the interference between the scattered radiation and the transmitted radiation ("Fraunhofer diffraction"), identifying systems of interference fringes associated respectively with the individual particles in which the interference pattern is affected by a phase delay of the scattered radiation relative to the transmitted radiation (inherent in the detection of Fraunhofer fringes), the delay being determined by the interaction of the radiation beam with the particles (inherent within the Fraunhofer diffraction), and determining the properties of the particles on the basis of the fringes that are affected by the phase delay (the disclosed system detects "existence" of particles and the "number" of particles);

(Claim 11) the detection of the plurality of radiation intensity values determined by the interference between the scattered radiation and the transmitted radiation comprises a measurement of the variation of the intensity values over time upon the passage of a particle through the incident beam, the determination of the properties of the particle being based on the variation over time of the fringes that are affected by the phase delay (Figure 9).

(Claim 12) the determination of the properties of the particles presupposes the determination of the position of transit of the particle through the incident beam by analysis of the asymmetry of the variation over time of the intensity values measured (The analysis is based upon an asymmetric diffraction pattern taken as a function of time. The process measures particles. Therefore, the reference is believed to anticipate this claim limitation. For further reasoning, see the rejection under § 112.);

(Claim 13) the measurement of the variation of the intensity values over time takes place by selection of the zone of transit of the particles (The zone of transit is inherently selected by construction of the apparatus.); and

(Claim 16) the determination of the properties of the particles on the basis of the lower-order fringes of the system of fringes is programmed in a manner such as to determine the distribution of the dimensions of the particles (as the "dimensions" are not defined, the existence is construed as being a dimension, and thus, Figure 8 clearly discloses the claim limitations.).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 8, 19, 22, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koshizuka.

Koshizuka teaches all the claimed elements except for: describing the lenses as cylindrical lenses; utilizing a CCD, NMOS, or CMOS; and utilizing a multi-colored source. Each of these elements is well known. See for example, U.S. Patent 4,429,995, where cylindrical lenses are used to create a blade ("fan") of light across a fluid flow to detect particle sizes. See for example U.S. Patent 6,411,406, where a CCD detector is utilized to measure wavefront aberrations in the measurement of particles, and various wavelength bands are utilized. It would have been obvious to one of

ordinary skill in the art at the time of invention to choose cylindrical lenses for the discloses optics, to choose a solid-state chip for the detector, and utilize a multi-colored light source as it has been held that combining known elements within a known apparatus to achieve predicted results is within the purview of one possessing ordinary skill, basic creativity, and common sense.

### ***Conclusion***

Several facts have been relied upon from the personal knowledge of the examiner about which the examiner took Official Notice in this Office Action mailed. The applicant must seasonably challenge well known statements and statements based on personal knowledge. See MPEP 2144.03; In re Selmi, 156 F.2d 96, 70 USPQ 197 (CCPA 1946); In re Fischer, 125 F.2d 725, 52 USPQ 473 (CCPA 1942); and In re Boon, 439 F.2d 724, 169 USPQ 231 (CCPA 1971).

A challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice. To adequately traverse such a finding, an applicant must specifically point out the supposed errors in the examiner's action, which would include stating why the noticed fact is not considered to be common knowledge or well-known in the art, a general allegation that the claims define a patentable invention being inadequate.

A seasonable challenge constitutes a challenge made as soon as practicable during prosecution. Thus, the applicant is charged with rebutting the well-known statement in the next reply after the Office action in which the well-known statement

was made. If the applicant does not seasonably traverse the well-known statement during examination, then the object of the well-known statement is taken to be admitted prior art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott M. Richey whose telephone number is (571) 270-1296. The examiner can normally be reached on Monday - Thursday, 10:00 - 17:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Toatley can be reached on (571) 272-2059. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Scott M. Richey  
Patent Examiner, Art Unit 2877

/Gregory J. Toatley, Jr./  
Supervisory Patent Examiner,  
Art Unit 2877  
14 August 2009